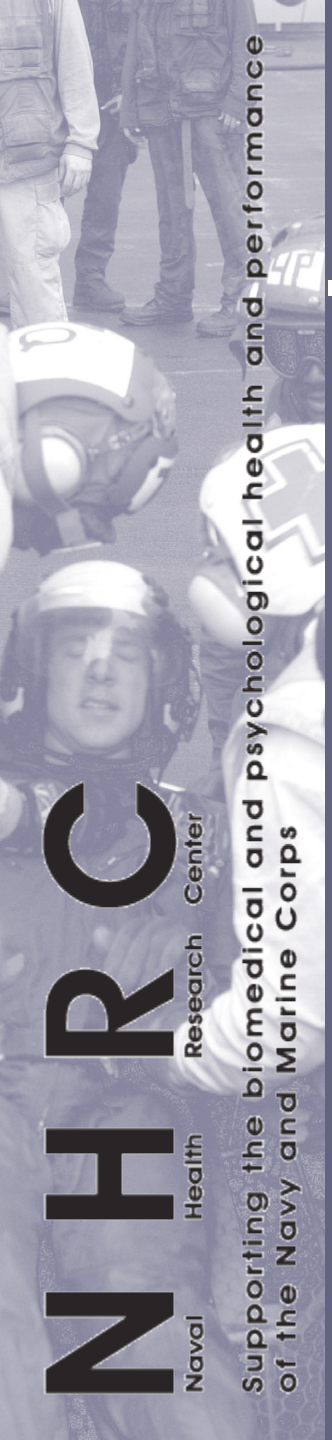
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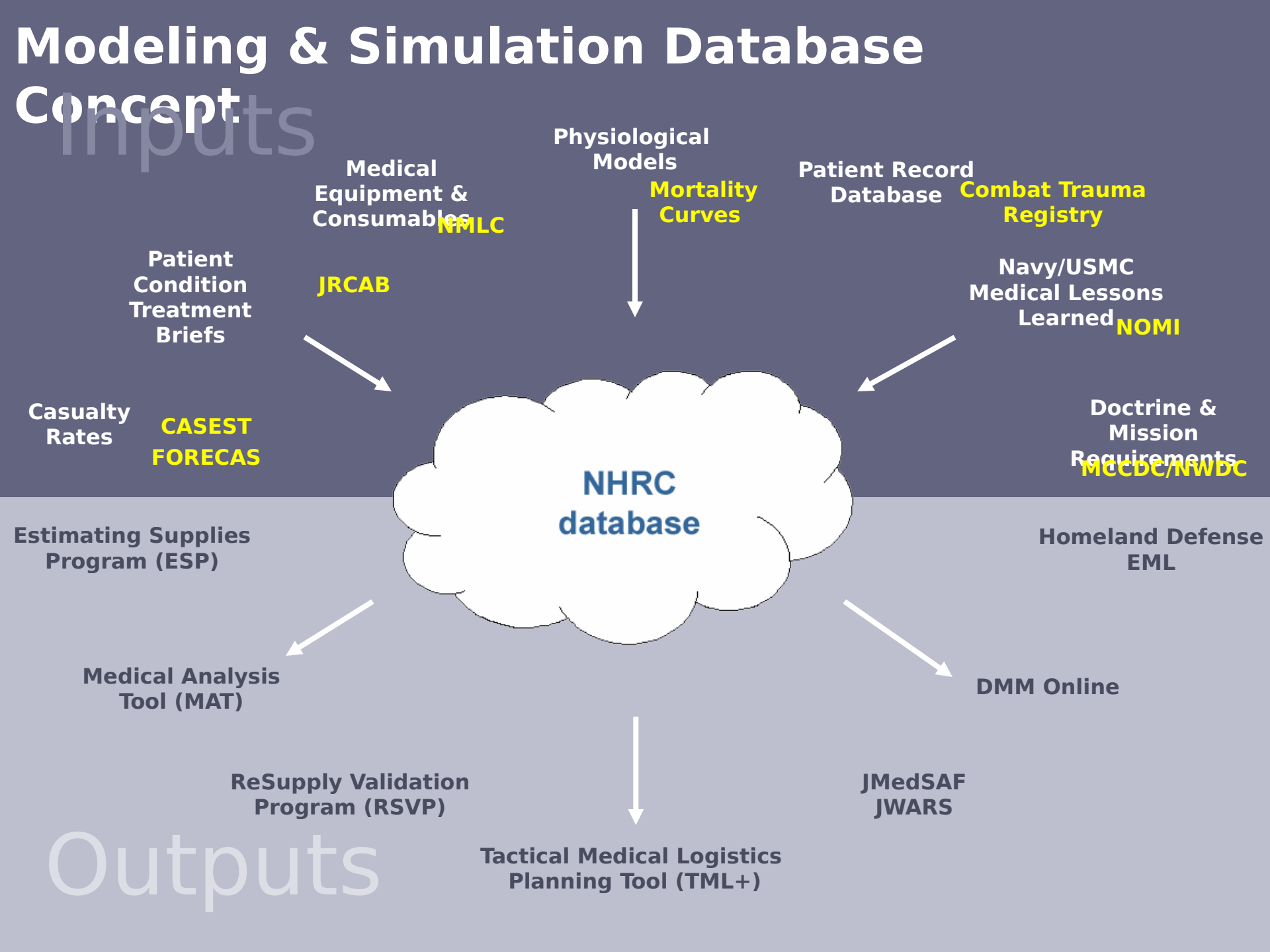
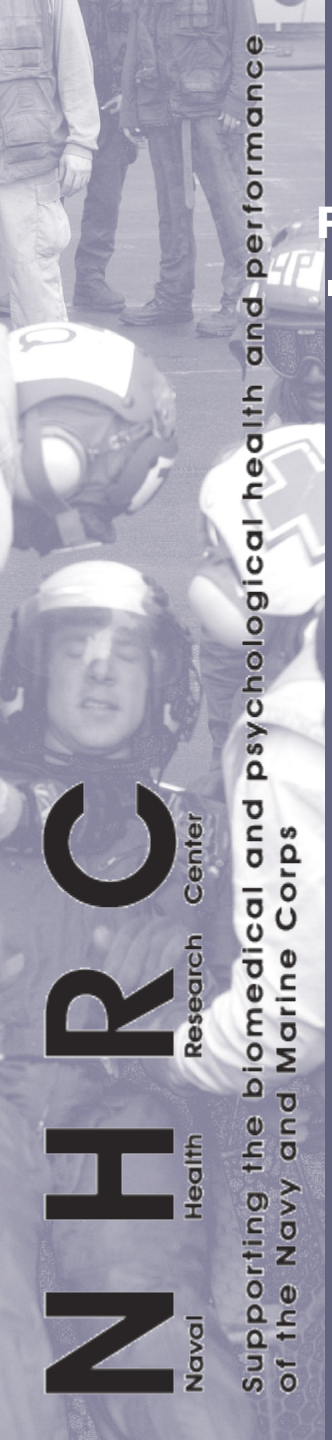
Medical Modeling & Simulation

Supporting Operational Medical Readiness

Modeling & Simulation Database Concept

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Casualty Estimation Tools

PROJECTION OF PATIENT FLOWS FOR MILITARY OPERATIONS

- Examination of empirical data
- Determination of underlying parameters
- Incorporation into software environment
- Adjustments for operational theater

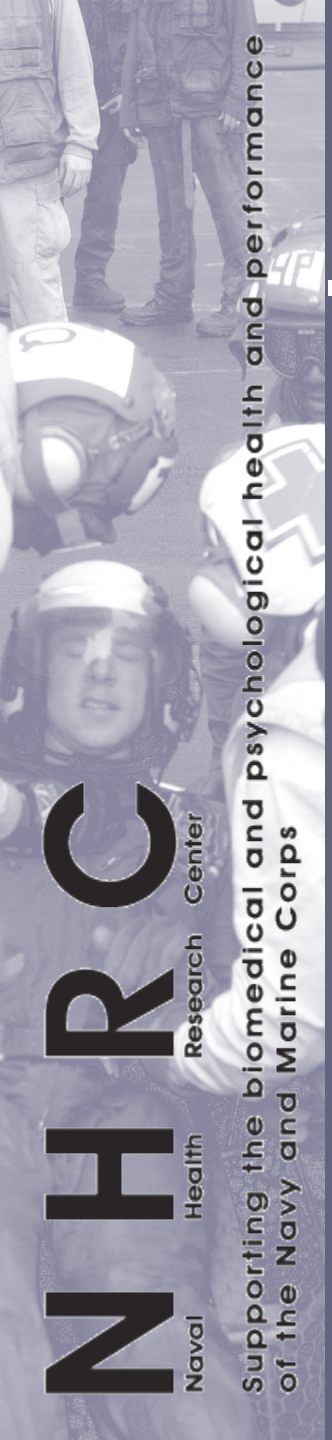
FORECAS
Ground Casualty Model

SLICECAS
Rate Variability Model

PKCAS
Peacekeeping Casualty Model

USA Today Mar 28, 200

Medical Resource Planning Tools
Technical Approach



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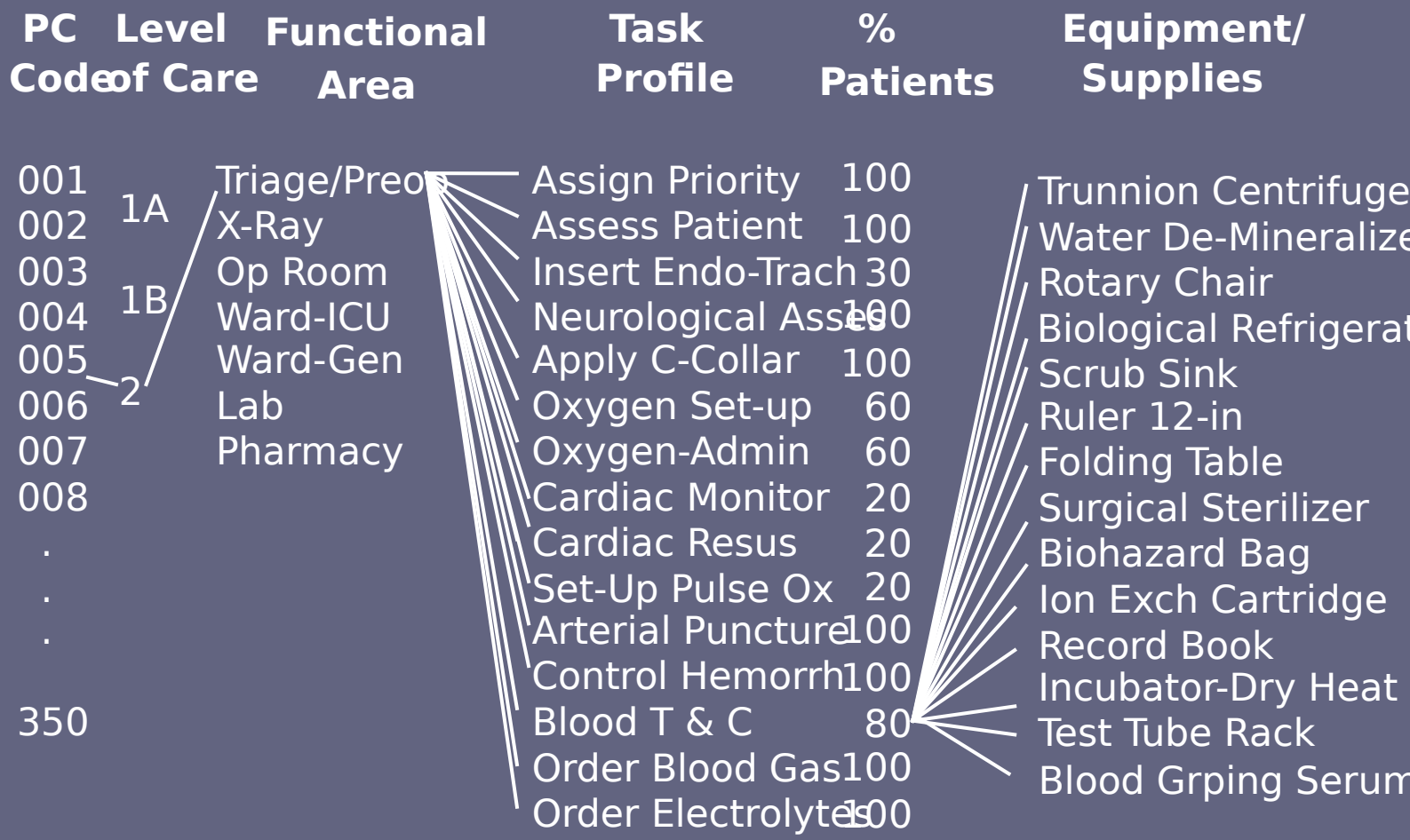

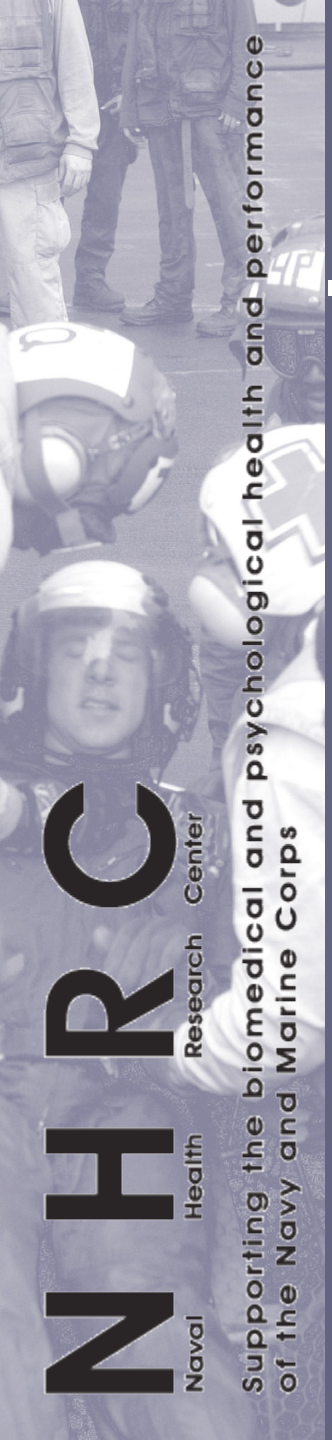
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Medical Resource Planning Tools

Results of Review Process

- Established a clinical requirement for every item pushed forward
- Reduced weight and cube (30%)
- Increased clinical capability

Marine Corps Medical Requirements

Battalion Aid Station	Pharmacy
Lab/X-Ray	Hot/Cold
Operating Room	Preventive Medicine
Shock Trauma Platoon	Dental
Ward Care	First Responder
FRSS	NBC
Sick Call	En route care

Shipboard Medical Requirements

IDC/GMO Trauma Care	Small Ship Surgical Capability
IDC/GMO Sick Call	

Approach endorsed by Headquarters Marine Corps & Marine Corps Syste
Command AMAL changes implemented by Naval Medical Logistics Comma

Medical Modeling & Simulation Tools

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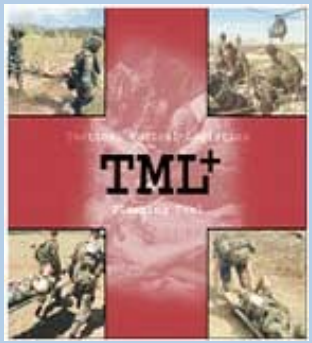
Deterministic

Uses for ESP and RSVP

- Forecast Medical Supply Requirements
- Evaluate Inventory Readiness
- Configure and Schedule Medical Resupply Requirements

Stochastic



Uses for TML+

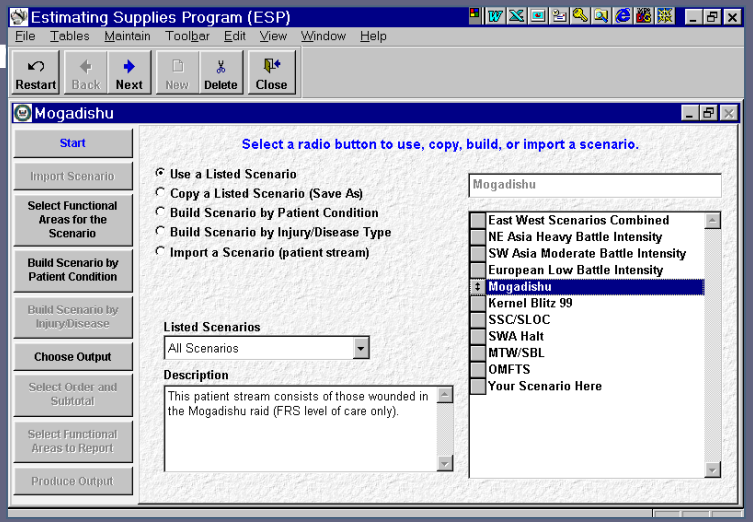
- Assess best and worst cases of a scenario
- Conduct course of action analysis
- Assess risk

Models & Simulations
Estimating Supplies Program

Estimating Supplies Program (ESP)

- Windows-based software program
- Created for military medical providers, planner and trainers
- Calculates the amount of consumables and equipment required to tr patient stream
- Available on the web

ESP's Start Screen


Estimating Supplies Program (ESP)
File Tables Maintain Toolbar Edit View Window Help
Restart Back Next New Delete Close
Mogadishu
Start
Import Scenario
Select Functional Areas for the Scenario
Build Scenario by Patient Condition
Build Scenario by Injury/Disease
Choose Output
Select Order and Subtotal
Select Functional Areas to Report
Produce Output
Select a radio button to use, copy, build, or import a scenario.
Use a Listed Scenario
Copy a Listed Scenario (Save As)
Build Scenario by Patient Condition
Build Scenario by Injury/Disease Type
Import a Scenario (patient stream)
Mogadishu
East West Scenarios Combined
NE Asia Heavy Battle Intensity
SW Asia Moderate Battle Intensity
European Low Battle Intensity
Mogadishu
Kernel Blitz 99
SSC/SLOC
SWA Halt
MTW/SBL
OMFTS
Your Scenario Here
Listed Scenarios
All Scenarios
Description
This patient stream consists of those wounded in the Mogadishu raid (FRS level of care only).

Use ESP to

- Identify the patient distribution
- Calculate the supplies needed for specific deployment or training exercise

ESP was developed by NHRC under the sponsorship of the Marine Corps Systems Command

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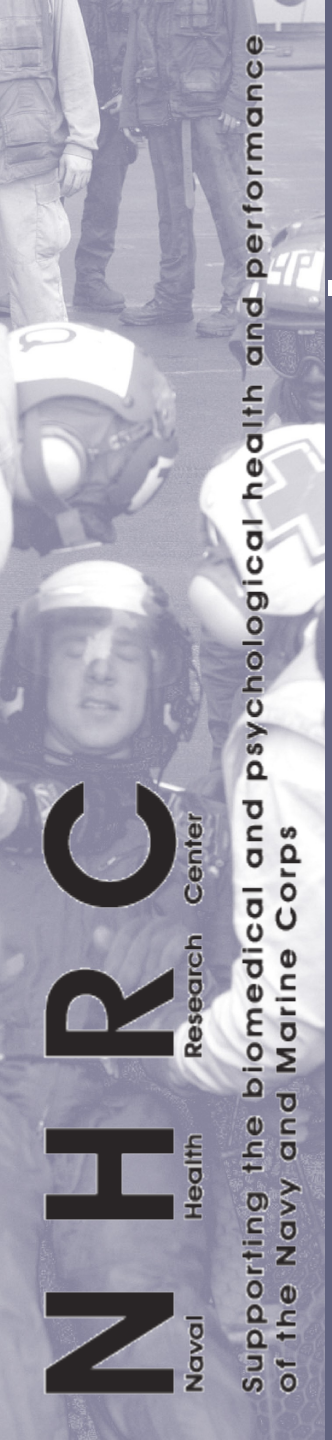
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ReSupply Validation Program

Problem with Current AMALs

- Based on notional casualty rate not linked to OPLANS
- Assume a constant consumption rate for all supply items
- Generates excess inventory

Solution

- Use a defined casualty rate to calculate initial and resupply requirements

Objective

- Meet USMC requirement to streamline Class VIII medical resources for greater mobility
- Use ESP to task organize and validate a supply stream
- Calculate the total number of each consumable supply item for a MPF MEF patient stream over 60 days

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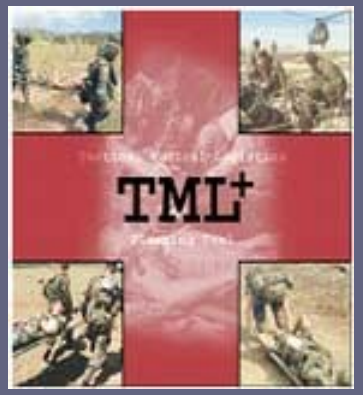
Models and Simulations

Tactical Medical Logistics Planning Tool (TML+)

Purpose

- To simulate the stochastic flow of patients through all battlefield treatment facilities
- To provide an easily configurable and expandable open architecture to aid a variety of medical planners/analysts
- To enhance the medical capability in JMedSAF by incorporating ESP and TML data to reflect additional types of treatment facilities and more complex medical operations



Benefits

- Provides better estimates for facility, personnel, supply, and transportation requirements
- Permits risk assessment, overall medical systems analysis, and operations research studies for a variety of scenarios

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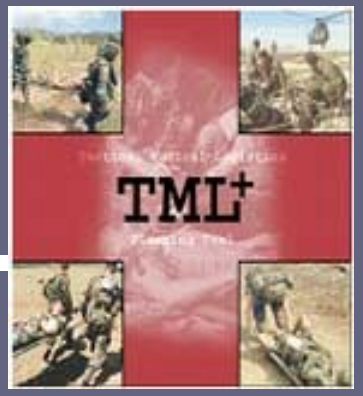
TML+ Underlying Data

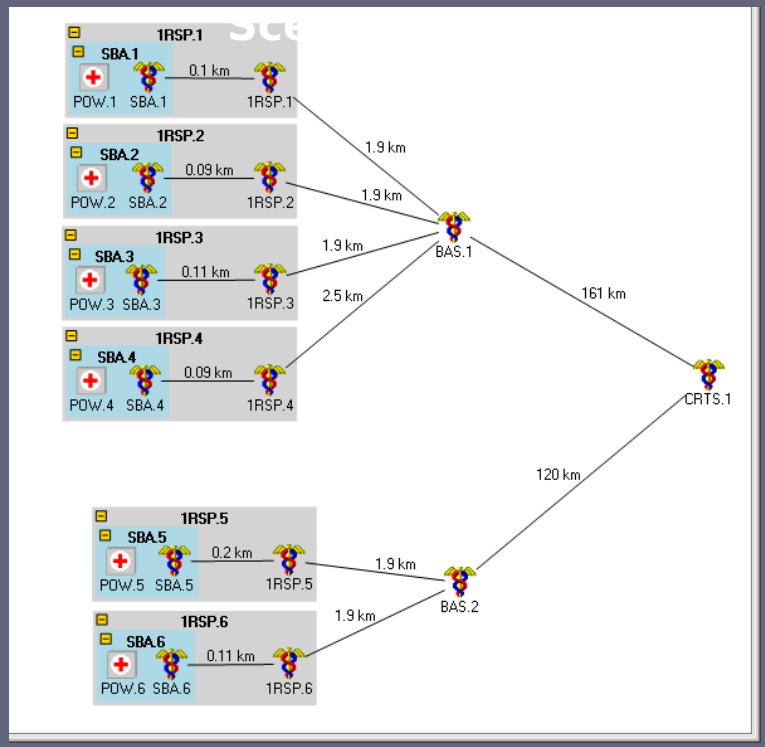


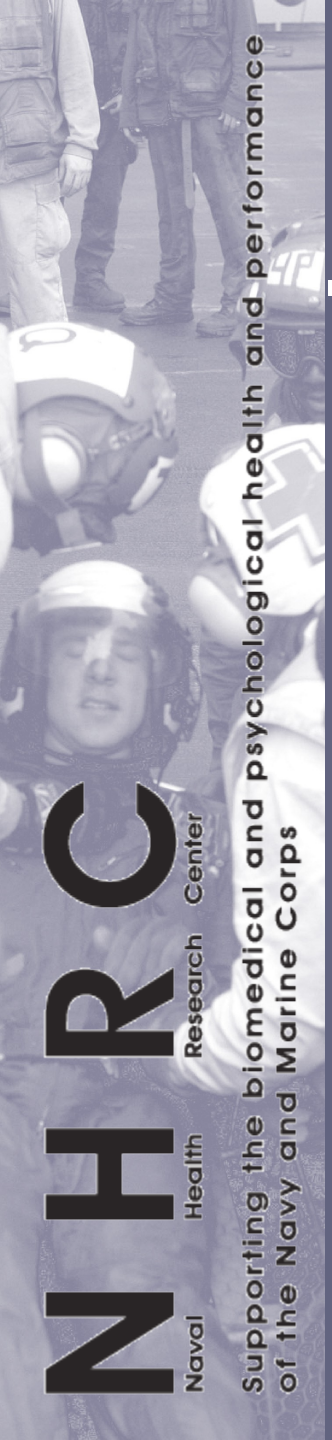
Simulates a queuing network of care facilities connected by transportation assets

Extensive underlying data

- **Levels of Care**
- **Functional Areas**
- **Number of Personnel**
- **Personnel Skill Sets**
- **PCs, tasks, supplies**
- **Weight, cube, cost of supplies**
- **Task sequences**
- **Treatment times**
- **Died of Wounds due to delay**
- **Died of Wounds due to complications**
- **Type, speed, and capacity of transportation assets**

TML+

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Current Initiatives

- AMAL Reviews – Sick Call, CBIRF, SC/OR, FRSS (SYSCO
- Operational Planning using FORECAS, ESP, RSVP and
- Small Ship Surgical Capability (PACFLT)
- OEF and OIF Lessons Learned (NOMI)
- Development of the Combat Trauma Registry (ONR)